segregation which is in agreement with a hypothesis suggesting two linked factors. However, in crosses with Eureka the data suggest other possibilities. Here the ratios are complicated by the fact that some plants show the presence of 1–2 pustules of a susceptible type. It was from these anomalous reactions that the rust was collected. Such anomalous reactions had been observed in the same cross with 222 Anz 3 in the previous year at Castle Hill, but the rust causing them had not been tested in the glasshouse.

On Stakman's varieties it proved to be race 222 and 222BB by adding Eureka and Yalta according to Waterhouse's scheme. However, all isolates of 222 Anz 3 from field collections have in the past behaved similarly on the sources of resistance, i.e. on Kenya 117A, TD1656, KD1451, AD1960 and Celebration. However, to this rust 222 Anz 4, TD1656 seedlings were clearly susceptible. Steinwedel × *T. timopheevi* material from a cross originally made by the late Mr. J. T. Pridham was also susceptible in the seedling stage. At Richmond, however, no rust was found on adult plants of this material, of TD1656, or of *T. timopheevi*, and the explanation must await further study.

The third rust, 126 Anz 3, is only of passing interest. It closely resembles the 126 and 126B originally described by Watson and Waterhouse (1949) and listed as 126 Anz 1 and 126 Anz 2 respectively. All sources of resistance show similar reactions to these three biotypes of race 126.

Conclusions.

Breeding for rust resistance can only be done on a sound basis if the information on the variability of the organism is complete. As a result of the findings reported herein it is apparent that the programmes in eastern Australia will have to be modified, since Marquillo, which has been a source of resistance, is now ineffective. To rust 21 Anz 1 there are still several useful resistances available. Among these are KD1451, TD1656, AD1960, Kenya 117A and probably Hope. Work already done with these will be unaffected by the occurrence of this new rust.

Race 222 Anz 4 is much more virulent than 21 Anz 1 in that it has a wider host range. It represents the type of rust that can be defined as a step mutation. It possesses all the virulence factors of 222 Anz 3 but its pathogenicity has been increased one step further, as shown by the susceptibility of seedlings derived from *T. timopheevi*. The future of these derivatives as a source of resistance cannot be decided until the reaction of adult plants is definitely established. No rust has been found on them so far. Should they remain resistant, then it is clear that an independent genetic system must be responsible, since close correlation has been found to exist between seedling and adult plant reaction of crosses involving TD1656.

It follows that despite the occurrence of new rusts several resistances are unaffected and this demonstrates again the value of genetic diversity in the parents used in breeding for disease resistance.

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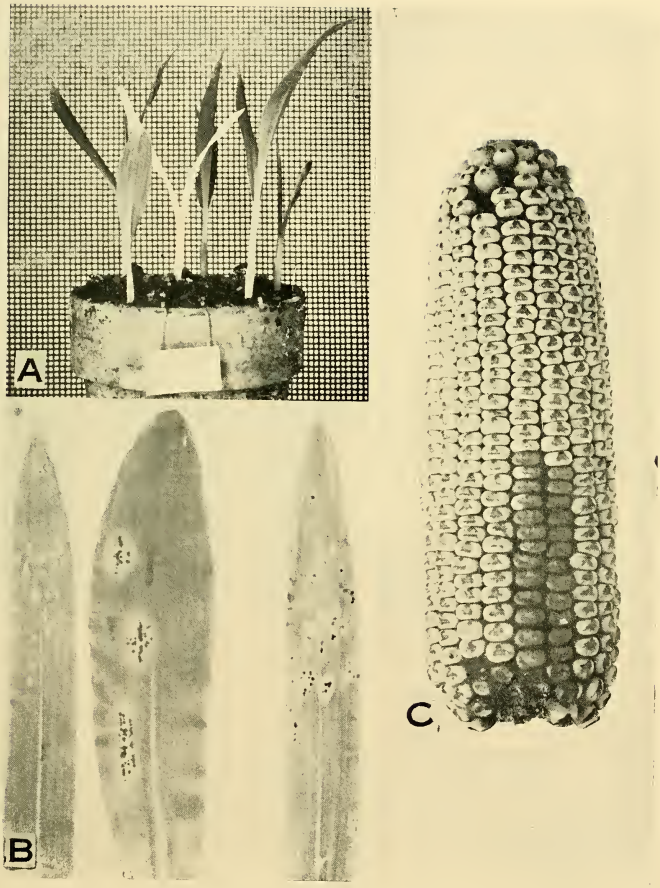
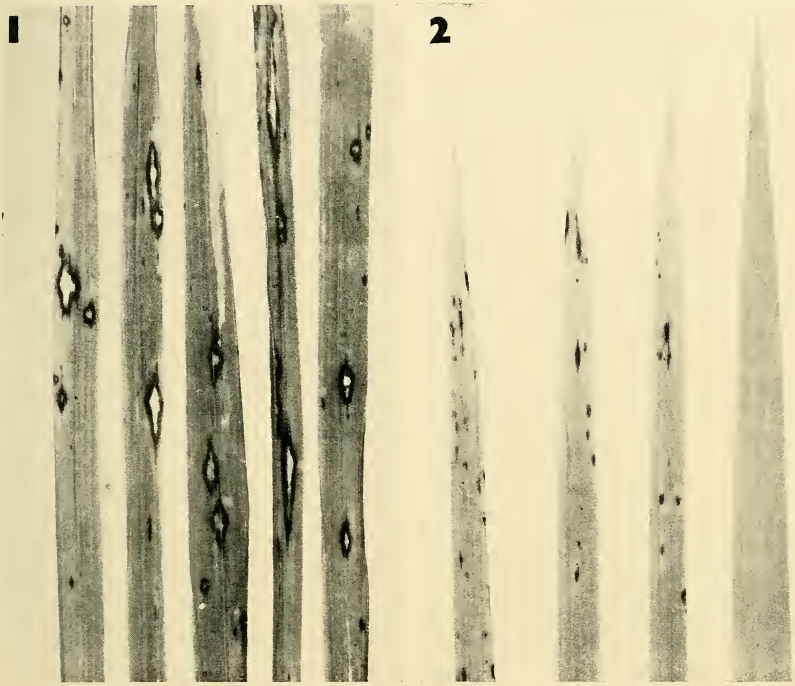
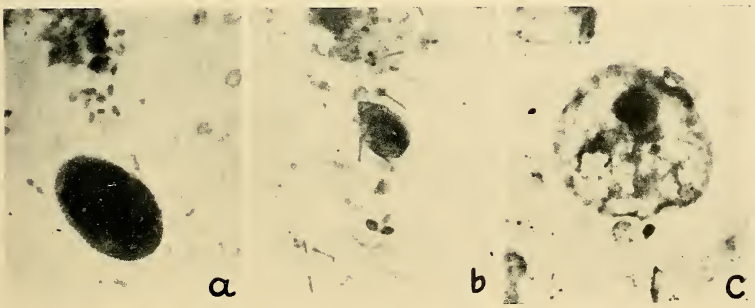


Rust of maize caused by *Puccinia sorghi*.



A. Diseases of Rice in Australia—1, brown spot; 2, rice blast.



B. Protozoan Populations in Soils—*a*, ciliate; *b*, flagellate; c, amoebae.